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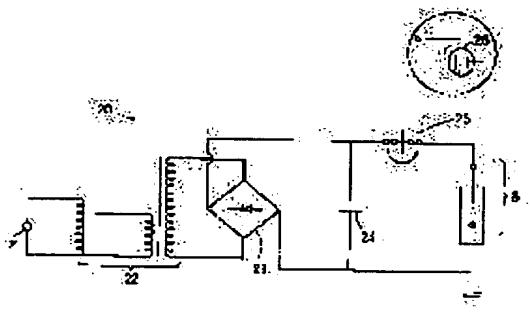
(54) CONTROL METHOD FOR WASTE GAS TREATMENT

(57)Abstract:

PURPOSE: To efficiently treat harmful components in waste gas such as NOx, SOx, dioxin and mercury without generating the environmental pollution problem steming from O3 and N2O.

CONSTITUTION: In waste gas treatment in which pulse corona discharge is generated at an electrode 8, components to be treated in waste gas such as NOx, SOx, dioxin and mercury are treated, when the concentration of O3 and N2O exceed the reference ones, the speed of revolution of a rotary spark gap 25 is lowered or voltage is reduced by an automatic transformer 22 so that the concentrations of O3 and N2O may become lower than the reference ones.



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CLAIMS

[Claim(s)]
[Claim 1] O3 in the exhaust gas by which this pulse corona discharge is generated in the offgas treatment which processes the processed component in that exhaust gas by generating pulse corona discharge in exhaust gas or -- if the concentration of N2 O exceeds criteria concentration -- O3 Or the control approach of the offgas treatment characterized by to control the pulse discharge power by that pulse corona discharge so that the concentration of N2 O becomes lower than that criteria concentration.
[Claim 2] O3 in said exhaust gas if either concentration and the concentration of N2 O exceed criteria concentration -- O3 both concentration and the concentration of N2 O -- although -- the control approach of the offgas treatment according to claim 1 characterized by controlling the pulse discharge power by the pulse corona discharge to become lower than each criteria concentration.
[Claim 3] It is the control approach of the offgas treatment according to claim 1 or 2 characterized by performing control of said pulse discharge power by control of the pulse frequency of said pulse corona discharge, or control of a pulse discharge electrical potential difference.
[Claim 4] Claim 1 characterized by using a rotary spark gap or a thyratron in order to generate said pulse corona discharge thru/or the control approach of offgas treatment given in either of 3.
[Claim 5] Claim 1 characterized by said processed component being a kind of NOx, SOx, dioxin, and the mercury, or two sorts or more thru/or the control approach of offgas treatment given in either of 4.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the control approach of the offgas treatment containing NOx, SOx, dioxin, mercury, etc.
[0002]
[Description of the Prior Art] In order to perform offgas treatment conventionally using the low-temperature plasma, making pulse corona discharge act on the exhaust gas is performed. By processing injurious ingredients, such as NOx in said exhaust gas, SOx, dioxin, and mercury, namely, carrying out the chemical reaction of these injurious ingredients, it decomposes into a harmless component or the low-temperature plasma generated by this pulse corona discharge is changed into the matter which is easy to remove.
[0003]
[Problem(s) to be Solved by the Invention] However, under implementation of such pulse corona discharge and O radical occur, and it is O2 in exhaust gas. It reacts and is O3. It is generated. Moreover, it is N2 in exhaust gas. It is contained and is these N2. By reacting by pulse corona discharge, N radical occurs and it is NO2 in exhaust gas. It reacts and N2 O arises. These [O3] And since each of N2 O is environmental pollutants, those generation must be controlled.
[0004] This invention was made in view of said trouble, and aims at offering the control approach of O3 which is an environmental pollutant while processing the injurious ingredient in exhaust gas efficiently, and the offgas treatment which controls generating of N2 O.
[0005]
[Means for Solving the Problem] The control approach of the offgas treatment of this invention that said technical problem can be attained In the offgas treatment which processes the processed component in the exhaust gas by generating pulse corona discharge in exhaust gas O3 in the exhaust gas by which this pulse corona discharge is generated or -- if the concentration of N2O exceeds criteria concentration -- O3 Or it is characterized by controlling the pulse discharge power by that pulse corona discharge so that the concentration of N2 O becomes lower than that criteria concentration. Here, if criteria concentration is less than [it], it is the concentration used as the boundary judged to be extent from which the amount of the harmful matter contained in the exhaust gas discharged in atmospheric air does not pose a problem.
[0006]
[Function] According to the control approach of the offgas treatment of this this invention, if the concentration of O3 or N2 O in exhaust gas exceeds criteria concentration during offgas treatment, the pulse discharge power by that pulse corona discharge will control namely, decline. By the fall of this pulse discharge power, generating of O radical and N radical falls, as a result, the yield of O3 and N2 O decreases, the concentration of that O3 and N2 O becomes lower than criteria concentration, and the problem of the environmental pollution by O3 and N2 O is avoided. This means that processing of injurious ingredients, such as NOx, SOx, dioxin, and mercury, is conversely performed by the maximum pulse discharge power in the range in which the concentration of O3 and N2 O does not result in criteria concentration, and processing of these injurious ingredients is performed efficiently.
[0007] In this this invention, each of O3 and N2 O from it being an environmental pollutant It not only controls pulse discharge power by one of concentration as mentioned above, but O3 in exhaust gas if both concentration and N2 O concentration are measured and either also exceeds criteria concentration -- O3 both concentration and the concentration of N2 O -- although -- it is desirable to control pulse discharge power by the pulse corona discharge to become lower than each criteria concentration (fall).
[0008] Moreover, although control of such pulse discharge power is attained by control of the pulse

frequency of pulse corona discharge, or control of a pulse discharge electrical potential difference, its control of a pulse frequency is more desirable.
[0009] A rotary spark gap or a thyratron is used as a means for generating pulse corona discharge in this invention.
[0010]
[Example] Next, it explains, referring to a drawing about the concrete example of the control approach of the offgas treatment by this invention.
[0011] The offgas treatment equipment 1 with which the control approach of the offgas treatment concerning one example of this invention is applied to drawing 1 is shown. In this offgas treatment equipment 1, first, it is sent into a cooling room 3 as the exhaust gas from an incinerator waste heat boiler is shown in the arrow head 2. It is cooled when the water supplied according to an arrow head 4 is getting down in the shape of a shower, and the exhaust gas sent into this cooling room 3 is sent into the discharge room 6 through a conduit 5. Pulse corona discharge is generated through an electrode 8 from the pulse generator 7 in said exhaust gas sent into this discharge room 6. It is desirable that the highest possible pulse voltage is used for this pulse corona discharge in the range from which spark discharge is not started in order to enlarge pulse discharge power as much as possible and to process harmful matter efficiently. Moreover, since the power with which a capacitor is covered will decrease, each pulse discharge power will decrease and the throughput of harmful matter will decline if it becomes high too much, although power with the fundamentally higher, big one is obtained, as for a pulse frequency, it is desirable to adjust a pulse frequency to extent to which each pulse discharge power does not fall. Thus, it is desirable to perform offgas treatment using the largest power (for it to be hereafter called the maximum pulse discharge power.) that adjusts a pulse voltage and a pulse frequency and is obtained.
[0012] That is, lifting decomposition of the chemical reaction is carried out, it changes to the harmless matter or harmful matter, such as NOx contained in said exhaust gas by pulse corona discharge which obtains the maximum pulse discharge power, SOx, dioxin, and mercury, changes to the matter which is easy to be removed. This matter that is easy to be removed is discharged as shown in an arrow head 10 as ashes from the **** equipment 9 with which predetermined processing is performed and the discharge room 6 is formed caudad. Moreover, O radical and N radical occur in coincidence as mentioned above by pulse corona discharge, O3 and N2 O are formed in it, and it is O3 in exhaust gas. Concentration and N2 O concentration rise. These [O3] Concentration and N2 O concentration are measured by the sensor 12 formed in the conduit 11 which the exhaust gas discharged from the discharge room 6 passes. 12 is this sensorO3. It has a detecting element and an N2 O detecting element, and is O3. Both concentration and N2 O concentration can be measured and it is O3. The data of both concentration and N2 O concentration are transmitted to said pulse generator 7. These [O3] The data of concentration and N2 O concentration are compared with criteria concentration in the pulse generator 7. O3 [and] case either concentration and N2 O concentration are higher than criteria concentration -- the pulse discharge power of the pulse generator 7 -- O3 both concentration and N2 O concentration -- although -- it falls so that it may be less than criteria concentration. Control of such pulse discharge power is O3. It is more desirable from the point of environmental protection to be carried out so that both concentration may be measured as mentioned above and the concentration of the both may become lower than each reference value, although it may be carried out so that either concentration or N2 O concentration may be measured and either may become lower than criteria concentration.
[0013] Thus, O3 After concentration and N2 O concentration fall, discharge power goes up to the maximum pulse discharge power again, and pulse corona discharge treatment is continued, and it is O3. If concentration and N2O concentration exceed criteria concentration, discharge power will decline again.
[0014] The exhaust gas which passed said conduit 11 is discharged, as it lets a bag filter 13 pass for removal of a fine grain and is shown by the arrow head 15 from the induction ventilator 14.
[0015] The circuit 20 corresponding to the pulse generator 7 and electrode 8 of said offgas treatment equipment 1 is shown in drawing 2 . In this circuit 20, alternating current is passed from thyristor-control AC power supply 21, and an electrical potential difference is changed into any value by the automatic transformation machine 22. The transformed current is rectified by the rectifier circuit 23 and a capacitor 24 stores electricity the acquired direct current. The electrical and electric equipment which this capacitor 24 stored electricity passes the revolving rotary spark gap 25, serves as pulse current, and is sent to the electrode 8 prepared in the discharge room 6 of said offgas treatment equipment 1, and pulse corona discharge generates it from an electrode 8. The gap of the anode plate and negative electrode in the field which generates this pulse corona discharge is 10-15cm, for example, the electrical potential difference of

10-15kV is applied. The thyratron 26 as shown in the circle of drawing 2 instead of a rotary spark gap 25 as a generating means of pulse current may be used.
[0016] It sets in such a circuit 20 and is O3 from said sensor 12. When the data about concentration and N2 O concentration are transmitted to said pulse generator 7, the decision device which is not illustrated is O3. Concentration, N2 O concentration, and each criteria concentration are measured, and it is O3. A command will be issued by a rotary spark gap 25 or the automatic transformer 22 if concentration and N2 O concentration are high. When the rotation spark gap 25 which received the command makes rotational speed late, a pulse frequency is made low, pulse discharge power is reduced, and the automatic transformer 22 which received the command reduces pulse discharge power by lowering a pulse discharge electrical potential difference. When reducing an electrical potential difference, an electronic rate is made to fall, although the number of electrons for each of also making a pulse frequency low and things for which a pulse discharge electrical potential difference is lowered to reduce pulse discharge power, and generate a radical will be lessened, and they are dioxin, mercury, NOx, and SOx. The removal engine performance will be affected greatly. Since an electronic rate does not change to it when making a pulse frequency low, the effect which it has on the removal degradation of harmful matter is advantageous few.
[0017] Although the pulse frequency and the pulse discharge electrical potential difference are changed for control of pulse discharge power, pulse discharge power may be controlled by the above example by changing a pulse discharge current and pulse shape.
[0018]
[Effect of the Invention] According to the control approach of the offgas treatment of this this invention, the injurious ingredient in exhaust gas, such as NOx, SOx, dioxin, and mercury, can be processed efficiently, without generating the problem of the environmental pollution by O3 and N2 O.

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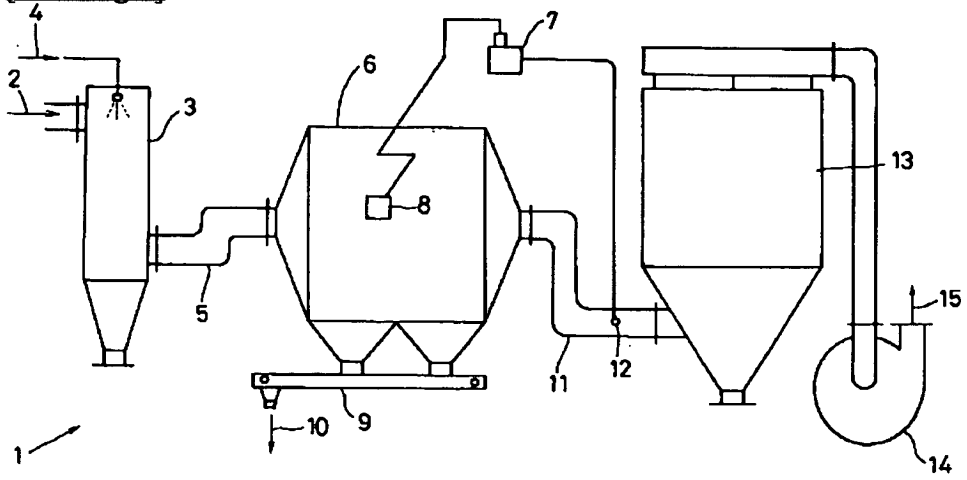
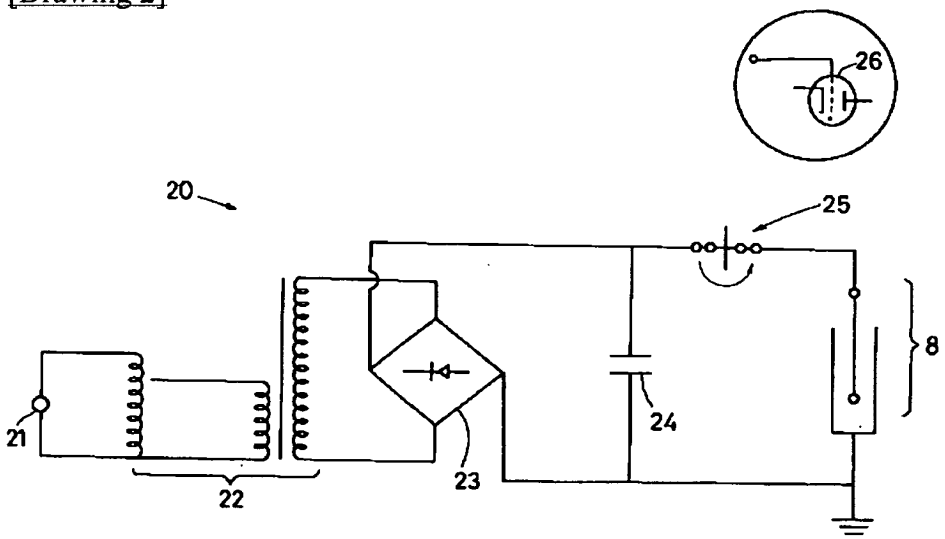
DRAWINGS

[Drawing 1]



[Drawing 2]



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